IN THE DRAWINGS:

Please replace the attached Replacement Sheet of Fig. 1. Fig. 1 is now labeled as "Prior Art."

REMARKS

Reconsideration and allowance of the above-identified application are respectfully requested. Claims 1-3, 5-10, 12-14, 16-17, 19-21, 23, 25-32 and 34-36 are currently pending. Claims 1, 5, 7, 10, 12, 16, 21, 23, 29, 32 and 34 have been amended. Claims 4, 11, 15, 18, 22, 24 and 33 have been cancelled.

Applicants note the objection to the drawings. A Replacement Sheet of Figure 1 adding the legend "Prior Art" is submitted herewith for the Examiner's review. Figures 2 and 3 currently state "Prior Art" on their respective Figure.

In the Official Action it is stated that the specification is replete with terms which are not clear, concise, and exact and that the specification should be revised carefully in order to comply with 35 U.S.C 112, first paragraph. Specific mention is made of paragraph [0010]. This paragraph has been rewritten to reflect the claim amendments.

Claims 1-3, 5-10, 12-14, 16-17, 19-21, 23, 25-32 and 34-36 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Specific mention is made of claims 1 and 23 which recited that gain has a first transverse electric (TE) component and a first transverse magnetic (TM) component. Applicants respectfully disagree, however, the claims have been amended to remove references to gain ratios. Accordingly reconsideration and withdrawal of the rejection of claims 1-33 under 35 U.S.C. 112, first paragraph are respectfully requested.

Claims 1-33 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully disagree, however, independent claims 1, 12 and 23 have been amended in a manner intended to clarify the language thereof. Accordingly reconsideration and withdrawal of the rejection of claims 1-33 under 35 U.S.C. 112 second paragraph are respectfully requested.

Claims 7 and 29 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Specific mention is made of the phrase "at an angle". Claims 7 and 29 have been amended to remove the phrase "at an angle". Accordingly reconsideration and withdrawal of the rejection of claims 7 and 29 under 35 U.S.C. 112 second paragraph are respectfully requested.

Claims 1-36 are rejected under 35 U.S.C. 102 (b) as being clearly anticipated by Kim et al. (U. S. Patent Application Number 2001/0043390). Prior to discussing this ground of rejection in detail, a brief description of a semiconductor optical amplifier (SOA) according to exemplary embodiments of the present invention is provided below to highlight some of the advantageous characteristics thereof.

According to exemplary embodiments of the present invention, semiconductor optical amplifiers (SOAs) have an overall gain (e.g., from device input to device output) that is substantially independent of the polarization state of the input, e.g., less than 1 dB difference between transverse electric (TE) gain and transverse magnetic (TM) gain. This is accomplished even though portions of the

active region of the SOA can have substantial (e.g., greater than 1 dB) polarization gain dependence.

SOAs according to the present invention include a portion in which TE gain is enhanced and a portion in which TM gain is enhanced by, for example, varying an etch depth of the residual cladding layer thickness. For example, over a first portion of the gain section, the residual cladding layer is thinner than over a second portion of the gain section. This results in the first portion providing more gain to optical energy having a TE polarization state than optical energy having a TM polarization state. In the second portion of the gain section, however, more gain is provided to optical energy having a TM polarization state than energy having a TE polarization state. The resulting gain differences can be designed to offset one another so that the output has a gain that is substantially polarization independent. Claim 1, reproduced below, is exemplary.

Amended Claim 1

"A semiconductor optical amplifier comprising:
a substrate;
a first gain section, disposed on said substrate;
a second gain section, disposed on said substrate and adjacent to said first gain section;
a residual cladding layer disposed above said first gain section and said second gain section,
wherein said residual cladding layer has a first thickness over said first gain section, and a second thickness over said second gain section, said first thickness being different than said second thickness,
wherein said first thickness of said residual cladding layer is selected to cause transverse electric (TE) light passing through said first gain section to experience a greater gain than transverse magnetic (TM) light passing through said first gain section; and
wherein said second thickness of said residual cladding layer is selected to cause said TM light passing through said second gain section to experience a greater gain than said TE light passing through said second gain section."

By way of contrast, the patent application of Kim et. al (hereinafter "Kim") describes creating a polarization insensitive SOA by controlling the growth of the active layer. More specifically, the Kim reference, describes two embodiments for creating a polarization insensitive SOA. In the first embodiment of Kim (para 0024),

> "The active layer 30, as mentioned above, is formed through the SAG process by applying a partial (or local) mask. For example, it is possible to form the active layer 30 divided into the first and second areas with different polarization modes by applying a mask having a narrower slot to the second area of the TE mode"

In the second embodiment of Kim (para 0027),

> "The active layer 30 is grown in two separate areas which are butt-jointed. That is, the first area 30a and the second area 30b are separately grown. Specifically, the first area 30a is grown as to obtain the TE mode gain by applying a tensile strain, whereas the second area 30b is grown as to obtain the TM mode gain by applying a compressive strain."

Thus it can be clearly seen that whereas Applicants describe selecting the thickness of the residual cladding layer to control TE gain and TM gain, Kim describes controlling the active layer growth to control TE gain and TM gain. The embodiments described in Kim therefore do not teach or suggest Applicants' amended claim 1 combination. For example, only in Applicants' amended claim 1 combination is it taught, among other things, "wherein said residual cladding layer has a first thickness over said first gain section, and a second thickness over said second gain section, said first thickness being different than said second thickness, wherein said first thickness of said residual cladding layer is selected to cause transverse electric (TE) light passing through said first gain section to experience a greater gain than transverse magnetic (TM) light passing through said first gain section; and wherein said second thickness of said residual cladding layer is selected to cause said TM light passing through said second gain section to

experience a greater gain than said TE light passing through said second gain section."

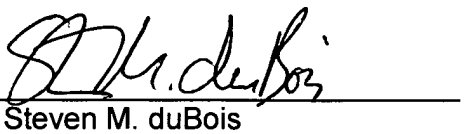
Similar comments apply to independent claims 12, 23, and 34 as well as dependent claims 2-3, 5-10, 13-14, 16-17, 19-21, 25-32 and 35-36.

Accordingly reconsideration and withdrawal of the rejection of claims 1-3, 5-10, 12-14, 16-17, 19-21, 23, 25-32 and 34-36 under 35 U.S.C. §102(b) over Kim are respectfully requested.

All of the objections and rejections raised in the Office Action having been addressed, it is respectfully submitted that this application is in condition for allowance and a notice to that effect is earnestly solicited. Should the Examiner have any questions regarding this response or the application in general, she or he is invited to contact the undersigned at (540) 361-1863.

Respectfully submitted,

POTOMAC PATENT GROUP PLLC

By: 

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